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Chemicals in Environmental Pressure Information System (EPIS)

Contents

1. Background	3
2. Purpose	3
2.1 Epis objectives	3
2.2 Project objectives.....	3
2.3 Technical approach.....	3
3. The Norwegian Product Register	4
3.1 Organisation and contents.....	4
3.2 Weaknesses in the Product Register	5
4. Method	6
4.1 General.....	6
4.2 Chemicals chosen	6
4.3. Chemical identity number.....	7
5. Results.....	9
5.1 Chemicals per NACE	9
5.2 Chemicals per product type	15
6. Discussion	18
6.1 General.....	18
6.2 Classification systems.....	19
7. Conclusions.....	21
References.....	22
Terms and definitions.....	23
Recent publications in the series Documents	24

1. Background

The development of the Environmental Pressure Information System, EPIS, originates from needs for timelier data on environmental pressures from human activities. A good integration between environmental and economic development will provide useful information for sustainable development.

The objective of EPIS is to provide a tool for the compilation of timely and harmonised data on environmental pressure arising from different economic activities. Consequently, EPIS will contribute to the production of pressure indicators and indices, indicators of sustainable development (e.g. efficiency indicators), to compilation of statistics on material flows and cumulative pressures as well as to the NAMEA Environmental Accounting (Eurostat 1999).

EPIS will compile data in a format that provides a link between environmental pressures and economic activity in the way that is most useful for comprehensive material flow assessment and for those engaged in economic-environmental decision making research (Eurostat 1999).

The EPIS approach takes as its starting point the conventional material balance approach; the inputs of materials and energy to one process are in balance with the system accumulation and outputs of the products and residuals arising from the same process in a given time period (Eurostat 1999).

Different countries have done several pilot studies. The Norwegian pilot studies have been focused at the compilation of pressure coefficients. Material flow approaches have been made for the Norwegian offshore oil and gas production (Rypdal and Tornsjo 1999), and recently for the wood-processing industry (Rypdal and Tornsjo 2000).

2. Purpose

2.1. EPIS objectives

EPIS will be an integrated database, which makes use of existing and forthcoming statistical and administrative data. It is therefore important to see how existing data systems can be utilised in EPIS,

2.2. Project objectives

In this project we will look at the integration of chemicals in EPIS on a general basis. This project is linked to Eurostat's sub group on scarce and hazardous materials. We will look at the possibility to utilise data on use of chemicals from the Norwegian Product Register, for use in EPIS. This experience would be useful for other countries as similar registers exists.

2.3. Technical approach

Use of chemicals has proven to be a difficult task in EPIS. In a mass balance, the quantities of chemicals will in general be small compared to other components. This is especially true for the quantities of scarce and hazardous chemicals. In addition, it is in general difficult to find data on this small, but very important flow of hazardous chemicals with respect to health and environment.

Information about use of products in industrial processes is available from Statistics Norway. However, these data are not given annually, but in four-year intervals. Information about use of products in the households is partly available from an annual survey by Statistics Norway, Survey of Consumer Expenditure. Use of chemicals in the agriculture is known. For use of products in other sectors only values, at an aggregated branch level, are available from the National Accounts. Figures in physical units can be estimated from these, but there will be a considerable uncertainty and the figures would be at an aggregated level.

The Norwegian Product Register¹ has data on use of all products to which the Regulations relating to classification, labelling etc. of dangerous chemicals (the Chemical Labelling Regulations) apply, if the quantity placed on the market each year is 100 kg or more. The products registered are mainly used in the manufacturing industry, but some are also used in the private households and services. The manufacturers have to report in what industry branches according to NACE the chemicals are used. The Product Register does not have information about medicaments, cosmetics and pesticides. In addition there is no requirement to declare solid processed articles. Thus, chemicals in textiles, chipboard etc. are not included in the register. Similar registers exist in some EU countries.

3. The Norwegian Product Register

3.1. Organisation and contents

The Norwegian Product Register is a subordinate agency of the Ministry of Local Government and Regional Development, and is responsible for obtaining and storing information on chemical products that are placed on the market in Norway.

In Norway, declaration is mandatory for all products to which the Regulations relating to the classifications, labelling, etc. of dangerous chemicals (the Chemical Labelling Regulations) apply, if the quantity placed on the market each year is 100 kg or more. Chemicals that may be hazardous to both health and the environment² are included. These regulations implement EU directives on the classification, labelling etc. of chemicals in Norwegian legislation. There is however a growing tendency to declare other products on a voluntary basis (Nordic Council of Ministers 1999)

Information on all products for which declaration is mandatory for the importer/manufacture is updated annually in the Norwegian Product Register. The register contains 24000 products in active use, which contain a total of 7200 different substances (Nordic Council of Ministers 1999). User branches with the largest numbers of products for which declaration are mandatory and net quantities (of March 1999) are given in table 3.1.

Table 3.1. User branches in Norway with the largest numbers of products for which declaration are mandatory, and net quantities (of March 1999). Tonnes

Branch	No. of products	Quantity, tonnes
Manufacture of chemicals and chemical products	3,951	2,164,547
Manufacture of other transport equipment	3,649	32,114
Construction	2,919	398,209
Publishing, printing and reproduction of recorded media	2,164	4,090
Manufacture of fabricated metal products, except machinery and equipment	2,120	9,236
Manufacture of rubber and plastic	1,929	66,482
Manufacture of machinery and equipment	1,672	9,362
Other service activities	1,546	11,141
Manufacture of basic metals	753	1,120,939
Extraction of crude petroleum and natural gas; service activities incidental to this	728	109,946

Source: Nordic Council of Ministers (1999)

¹ We want to thank the Norwegian Product Register by Jan Kraft for goodwill and useful information during the work with the project.

² Declaration is mandatory for products that are pure substances and which are labelled with at least one of the risk phrases indicating danger for the environment.

Some of the information that is reported to the Product Register is:

- Warning labels for each chemical. The warning label also covers carcinogenic, sensitising or mutagenic properties and toxicity for reproduction.
- Quantities of a product actually manufactured/imported/exported/renamed during a year. For new products estimated quantities for the current year are given. For the manufacture and distribution of chemical products that are partly or wholly used in the enterprise, separate figures for the quantities used in the enterprise as raw materials and for consumption (e.g. cleansing fluid, cutting fluid) is reported.
- Branches of industry (NACE) where the product is used. The importer/manufacture reports the most important branch(es) of industry where the product is used. From 1999 they also have to report the percentage of the total used in the various branches.
- Product type. The product type(s) is reported, and from 1999 the percentage of use in the different product types have to be reported. The registers in Denmark and Norway use the same coding system for the product types. Sweden has developed their own system, but is considering using the same as Denmark and Norway. Finland has developed its own system.
- The complete chemical composition of the product. All the substances in the product, their unambiguous names, identity numbers (Chemical Abstracts Service Registry (CAS) number), warning labelling and percentages by weight have to be reported to the Product Register.
- Quantities of the constituents. There is no minimum percentage below which constituents need not be declared (Product Register 1998).

In Sweden the declaration requirements are based on the customs tariff codes so that as a general rule, they apply to all chemicals products (substance and preparations). The Swedish register therefore contains more products than those classified as dangerous according to EU legislation. The Product Register in Sweden does not require 100 per cent composition of the products. There is however work going on in Sweden concerning criteria for which chemicals that are dangerous.

3.2. Weaknesses in the Product Register

Statistics Norway does not have access to the Product Register's database from our office. The data are only available at the register's office.

The data used in this work can only be available in paper copies at the time being and at the Product Register's office. Using data in this form will be a very time-consuming job. Ideally all the information should be available in files in common software and the data should be on an easy usable form. The Product Register is however planning to make their data system more usable in the near future.

Another limitation of the use of data from the Product Register is the confidentiality rules. Only if four or more products are used in a branch the data can be used. A limitation will also be the number of manufacturers reporting the product, only if more than three companies' report a product the data can be used. More data may however be available if the information is known from other sources. It is a time demanding task to check this.

Chemicals included in solid treated articles imported are not included, e.g. Cd in toys, paint on toys, textiles and plastic are not included in the Norwegian Product Register. This may be a significant amount. Cosmetics, medicines and pesticides are not included either, as these are included in other regulations. In principle products that are not included by the Labelling law are not included in the register. This applies for several chemicals dangerous to the environment, as they may be included in a mixture that not has to be labelled. However, a proposed regulation, which will include labelling of these products is to be sent for comments soon.

If a product is classified in accordance to the Chemical Labelling Regulations in Norway, it has to be labelled independent of the amount placed on the marked. A declaration is however needed if more than 100 kg is placed on the marked. There are however some products that just have to be labelled but no declaration is needed. In some of these cases there exists a voluntary declaration.

The Product Register has mainly a function as an administrative register, and it was not made with the intention to give distribution of chemicals per branches of industry. Therefore a certain double counting of quantities and number of chemicals may occur. The data reported do not give the exact final use of chemicals. A chemical is reported to the Product Register when it is produced or imported. It can later be used in other products, which also are reported to the Product Register. The amount may therefore be reported several times. On the reporting scheme it is asked if the product are used as raw material or not, but the problem is that in most cases the importer and the user of the products are not the same. If they are the same, the Product Register has a chance to correct the possible double counting.

It is the producing and importing enterprises that give information about the chemicals main application in Norway. The enterprises give the main use according to NACE. Previously the quantity was split equally between the branches given, but from 1999 percentages must be given. The quality of the information about the distribution between the branches may vary. If the industry has reported use of a chemical in several branches without giving a percentage distribution of the use, the amount of chemical used is split equally. In general most of the enterprises only give one branch.

4. Method

4.1. General

The Product Register can make a search in their database for the use of chemicals given either per branch or per product type. Which chemicals that should be included in such a search and their CAS-number has to be found first.

4.2. Chemicals chosen

In this work we have, as an example, chosen to look at the use of chemicals which are included in the OSPAR list of chemicals for priority action. This list was chosen as it includes chemicals dangerous to both health and environment, and use of them are planned to be stopped in the year 2020 (Høygaard 1999). The chemicals included in the list and important sources are shown in table 4.1.

Table 4.1. OSPAR list of chemicals for priority action, and important sources.

OSPAR list	Important sources/field of use
Polychlorinated dibenzodioxins (PCDDs)	Forms in combustion processes (where chlorine is present) and in some industrial processes.
Polychlorinated dibenzofurans (PCDFs)	Forms in combustion processes (where chlorine is present) and in some industrial processes.
Polychlorinated biphenyls (PCBs)	Isolating and coolant in electric equipment (condenser, transformer), grouting/glue.
Polyaromatic hydrocarbons (PAHs)	Forms in incomplete combustion in industry, wood fuel stove, combustion of waste, oil products.
Pentachlorophenol (PCP)	Impregnation of wood and textiles.
Short chained chlorinated paraffins (SCCP)	Plasticides in paint and glue, flame retardants.
Hexachlorocyclohexane isomers (HCH)	Used in the pesticide lindan (no longer used in Norway).
Mercury and organic mercury compounds	Thermometers, batteries, electrical switches.
Cadmium	Rechargeable batteries, emissions from different industry branches, manure, combustion of oil products and coal.
Lead and organic lead compounds	Melting plants, lead batteries, additives to gasoline and plastic, ammunition, lead weight, metallic products.
Organic tin compounds	Coating to boats, seine- and wood impregnation, emissions from boat-builders yard.
Nonylphenol/etoxylates (NP/NPEs) and related substances	Cleaning products, paint, glue, varnish, plastic, pesticides.
Musk xylene	Cleaning products.
Brominated flame retardants	Retard inflammable of plastics and textiles.
Certain phthalates - dibutylphthalate and diethylhexylphthalate	Cleaning products, paint, varnish, glue, plastic ¹ .

¹ SFT (1996)

Sources: OSPAR (1998) and the Ministry of Environment (1997)

The OSPAR list was made in 1998 and is only preliminary as work is going on to update and complete the list before the year 2000. The list is a mix of chemicals and groups of chemicals, e.g. cadmium is a specific compound while PAH includes several compounds.

4.3. Chemical identity number

Each chemical in the Product Register has an unambiguous identity number, a CAS number (Chemical Abstracts Service Registry number). According to the Norwegian Pollution Control Authority, there exists no list over CAS numbers that are included in each of the OSPAR chemicals/groups of chemicals. CAS numbers for performing a search in the register were chosen from different sources. For three of the OSPAR chemicals, organic tin compounds, nonylphenol/etoxylates and certain phthalates, CAS numbers were collected from a survey of chemicals with possible endocrine effects (SFT 1996). CAS number for the remaining chemicals, except polychlorinated dibenzofurans, were found in 'OSPAR 1998 List of Candidate Substances' (OSPAR 1998). Table 4.2 shows some of the CAS numbers that are supposed to be included in the OSPAR list. It is also shown which of the chemicals that were found in the Product Register.

As a start the Product Register made a search in their database for chemicals used in specific branches. The branches NACE 17 (Manufacture of textiles) and NACE 21 (Manufacture of pulp, paper and paper products) were chosen as they use substantial amounts of chemicals. Then, relevant CAS numbers from these scans may be picked out (manually), and a search can be done to find the distribution of these chemicals in other branches. It was a difficult task, as we did not know which CAS numbers that should be included in each OSPAR chemical. The two branches chosen did not

give a representative number of OSPAR chemicals. CAS numbers were found from the sources described above.

It was also discovered that data, for the branches chosen, could not be found for a detailed NACE level. This is due to the fact that most of the manufacturers have not reported a detailed NACE to the register. For use in EPIS, the quantities of chemicals should preferably be given at the most detailed level of NACE to get as reliable coefficients as possible.

Table 4.2. OSPAR chemicals and CAS numbers.

OSPAR list if chemicals for priority action	CAS number	Name	Found in the Product Register
Polychlorinated dibenzodioxins (PCDDs)	1746016	2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)	
Polychlorinated dibenzofurans (PCDFs)			
Polychlorinated biphenyl (PCBs)	1336363	PCB	
Polyaromatic hydrocarbons (PAHs) ¹	120127	Anthracene	x
	206440	Fluoranthene	
	50328	Benzo(a)pyrene	x
	91203	Napthalene	x
	85018	Phenantrene	x
	192972	Benzo(e)pyrene	x
	205992	Benzo(b)fluoranthene	x
	207089	Benzo(k)fluoranthene	x
	72254069	Indenopyrene	
	191242	Benzo(g,h,i)perylene	
Pentachlorophenol (PCP)	87865	Pentachlorophenol	
Short chained chlorinated paraffins (SCCP)	85535848	Chlorinated paraffins, short chained	x
Hexachlorocyclohexane isomers (HCH)	319857	beta-HCH	
	608731	HCH	
Mercury and mercury compounds	7439976	Mercury	x
Cadmium	7440439	Cadmium	x
Lead and organic lead compounds	7439921	Lead	x
Organic tin compounds	56359	Tributyltin compounds	
	688733	Tributyltin compounds	x
	1983104	Tributyltin compounds	x
	2155706	Tributyltin compounds	x
	3090355	Tributyltin compounds	
	4342307	Tributyltin compounds	
	4342363	Tributyltin compounds	
	4782290	Tributyltin compounds	
	24124252	Tributyltin compounds	
	26239645	Tributyltin compounds	
	26354187	Tributyltin compounds	x
	36631239	Tributyltin compounds	
	85409172	Tributyltin compounds	x
Nonylphenol/etoxylates (NP/NPEs) and related substances	104405	p-Nonylphenol	
	2717055	Heptaoxsatrooxan-1-ol, 23-(nonylfenoxy)3,6,9,12,15,18,21-nonylpheonlmonoetoxylate	
	9014908		x
	9016459	Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy-	x
	9040657	Formaldehyde, polymer with nonylphenol	x
	25154523	Nonylphenol	x
	26027383	Poly(oxy-1,2-ethanediyl), a-(4-nonylphenyl)-w-hydroxy-	x
	27986363	Nonylphenolmonoetoxylate	x

	37205871	Poly(oxy-1,2-ethanediyl), a-(isononylphenyl)-w-hydroxy-	x
	51811791	Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy, phosphate	x
	68412544	Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy-, ramified	x
	68891214	Poly(oxy-1,2-ethanediyl), a-sulpho-w(2,4,6-tris(1-methylpropyl)phenoxy)-, natrium salt	x
	109909399	Poly(oxy-1,2-ethanediyl), a-sulpho-w(2,4,6-tris(1-methylpropyl)phenoxy)-, natrium salt	x
Musk xylene	81152	Musk xylene	x
Brominated flame retardants	36355018	Hexabromobiphenyl	
Certain phthalates - dibutylphthalate and diethylhexylphthalate	84742	Dibutylphthalate	x
	117817	Diethylhexylphthalate	x

¹ Only 10 PAH's are included as their CAS-number were easy to find (the Product Register did not have the opportunity to find CAS number for us).

Source: OSPAR (1998), SFT (1996).

5. Results

5.1. Chemicals per NACE

Table 5.1 shows data per branch available from the Product Register. In the first row in the table for each chemical the total quantity registered is shown. In the row below, the quantities of the chemical used in specific branches are given. As seen for chlorinated paraffins, only one branch is given due to confidentiality reasons, while no branches could be given for e.g. mercury. PAHs is given as a group as data for the specific chemicals included could not be given per branch due to confidentiality. The difference between the total quantity in the first row and the quantities per branch may indicate the amount of data that are not available due to confidentiality reasons.

A simplified declaration is introduced for some products in the Product Register, mainly paints, e.g. a declaration for each paints in a series with paints with different colours is not needed. A declaration, which covers the whole series, can be given. This means that the percentage of a chemical used may differ, and the percentage of some chemicals in a product may be reported as an interval. This explains why the Product Register gives an interval of amount used for some chemicals. The highest percentage represents the 'worse case'. The amounts corresponding to the highest percentage are shown in table 5.1. The chemicals given in the OSPAR list are in italics.

Table 5.1. OSPAR chemicals per branch. Tonnes

Cas no.	Name	NACE	NACE name	Tonnes
85535848	Short chained chlorinated paraffins (SCCP) Chlorinated paraffins, short chained			15.9
		24	Manufacture of chemicals and chemical products	7.3
7439976	Mercury and organic mercury compounds Mercury			0.4
7440439	Cadmium			1.7
7439921	Lead and organic lead compounds Lead			6972
		24	Manufacture of chemicals and chemical products	0.1
	PAHs¹	11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying	1088
		24	Manufacture of chemicals and chemical products	6.6
		27.10	Manufacture of basic iron, steel and of ferro-alloys (ECSC)	7.5
		27.4	Manufacture of basic precious and non-ferrous metals	0.05
		35.1	Building and repairing of ships and boats	18.0
		45	Construction	0.05
2155706	Organic tin compounds Tributyltinmetacrylate			524
26354187	Tributyltinmetacrylate-methylmetacrylate			31.3
85409172	Tributylstannane, mono(naphtenoyloxi)deriv.			28.1
		24	Manufacture of chemicals and chemical products	6.9
9016459	Nonylphenol/etoxylates (NP/NPEs) and related substances Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy-	45	Construction	1.1
				0.08
				136
		01	Agriculture, hunting and related service activities	0.8
		15	Manufacture of food products and beverages	0.4
		24	Manufacture of chemicals and chemical products	49.5
		24.301	Manufacture of paints, varnishes and similar coatings	0.2
		27.10	Manufacture of basic iron, steel and of ferro-alloys (ECSC)	0.9
		28	Manufacture of fabricated metal products, except machinery and equipment	0.6
		29	Manufacture of machinery and equipment N.E.C.	0.3
		29.4	Manufacture of machine-tools	0.9
		35.1	Building and repairing of ships and boats	0.1
		45	Construction	9.4
		55	Hotels and restaurants	0.9
		60.21	Other scheduled passenger land transport	21.0
		63	Supporting and auxiliary transport activities; activities of travel agencies	0.5
		74	Industrial cleaning	13.0
		80	Education	0.3
		85.3	Social work activities	0.6
		93	Other service activities	16.1

Cas no.	Name	NACE	NACE name	Tonnes
25154523	Nonylphenol	11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying	26.0
		24	Manufacture of chemicals and chemical products	0.9
		35.1	Building and repairing of ships and boats	13.4
		45	Construction	1.4
				9.9
26027383	Poly(oxy-1,2-ethanediyl), a-(4-nonylphenyl)-w-hydroxy-	24	Manufacture of chemicals and chemical products	1.0
37205871	Poly(oxy-1,2-ethanediyl), a-(isononylphenyl)-w-hydroxy-			0.3
51811791	Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy, phosphate			7.9
68412544	Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy-, ramified			0.1
		15	Manufacture of food products and beverages	298
		22.2	Printing and service activities related to printing	0.9
		24	Manufacture of chemicals and chemical products	1.7
		28	Manufacture of fabricated metal products, except machinery and equipment	94
		29	Manufacture of machinery and equipment N.E.C.	0.2
		45	Construction	0.4
		50.2	Maintenance and repair of motor vehicles	2.1
		55	Hotels and restaurants	101
		60.21	Other scheduled passenger land transport	0.5
		61	Water transport	21.8
		74.7	Industrial cleaning	0.2
		93	Other service activities	9.8
		PR1	Private application	24.8
		PR2	General application	15.3
		PR3	General manufacturing	15.3
				2.3
109909399	Poly(oxy-1,2-ethanediyl), a-sulpho-w(2,4,6-tris(1-methylpropyl)phenoxy)-, natrium salt			0.4
	Nonylphenoletoxilate with EO < 9			4.4
	Nonylphenoletoxilate with EO = 9-19			2.4
		74.7	Industrial cleaning	0.03
		93	Other service activities	0.6
81152	<i>Musk xylene</i>			0.04
84742	<i>Certain phthalates - dibutylphthalate and diethylhexylphthalate</i> Dibutylphthalate			
		22.2	Printing and service activities related to printing	176
		24	Manufacture of chemicals and chemical products	5.5
		25.2	Manufacture of plastic products	44.8
		35.1	Building and repairing of ships and boats	17.5
		45	Construction	7.5
		93	Other service activities	77.1
				0.5

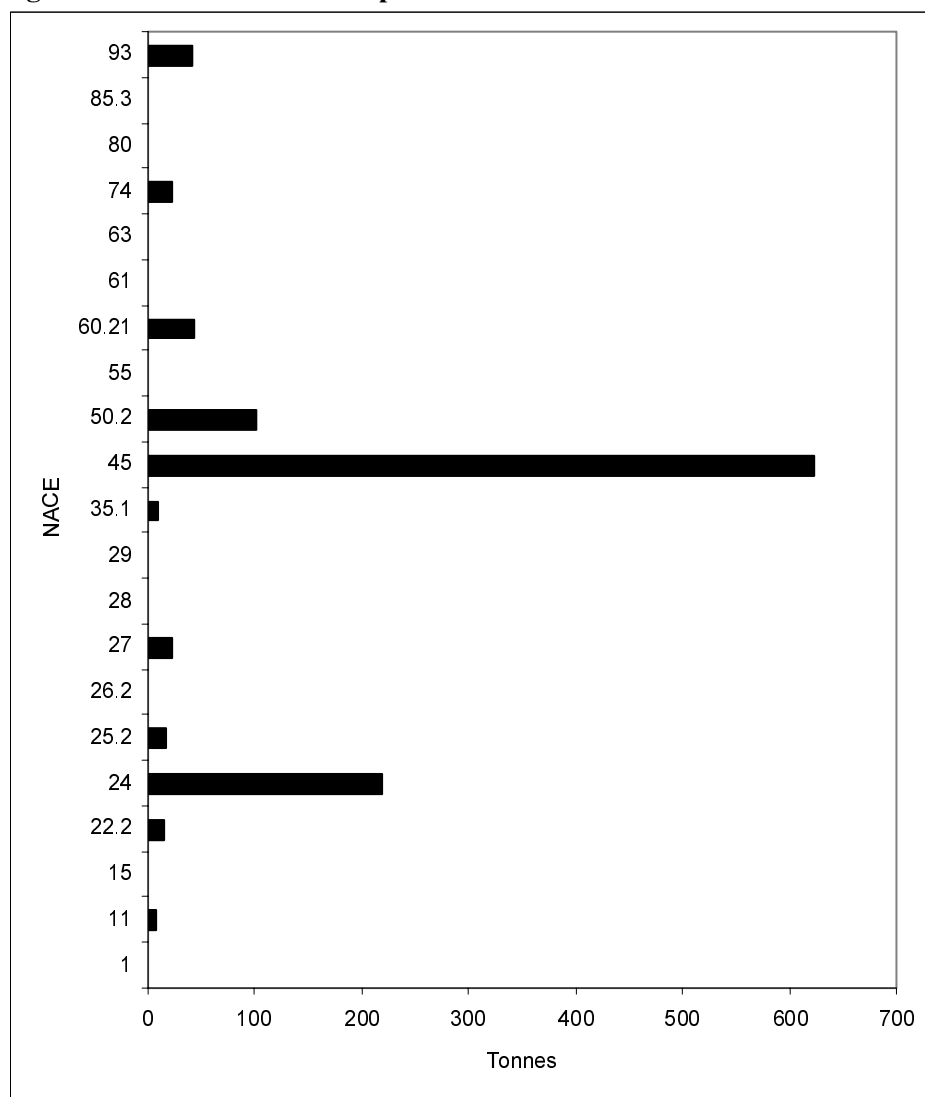
Cas no.	Name	NACE	NACE name	Tonnes
117817	Diethylhexylphthalate			3348
		22.2	Printing and service activities related to printing	8.4
		24	Manufacture of chemicals and chemical products	2143
		25.2	Manufacture of plastic products	1122
		26.2	Manufacture of non-refractory ceramic goods other than for construction purposes; manufacture of refractory ceramic products	0.1
		27	Manufacture of basic metals	2.8
		45	Construction	0.5
		93	Other service activities	0.01

[†] PAH include: antracen, benzo(a)pyrene, naphthalene, phenantrene, benzo(e)pyrene, benzo(b)fluoranthene and benzo(k)fluoranthene.

Source: The Norwegian Product Register

In figure 5.1 the sum of OSPAR chemicals in each branch is shown. As mentioned earlier, double counting may occur as the importer and the manufacturer not are the same in most cases. The high value seen in branch 45 'Construction' is mainly due to PAHs. Diethylhexylphthalate is not included in branch 24 'Manufacture of chemical and chemical products' and 25.2 'Manufacture of plastic products' as it will dominate the figure. It is important to remember that the picture given in figure 5.1 is not complete due to confidentiality rules.

Figure 5.1. OSPAR chemicals per NACE sector. Tonnes

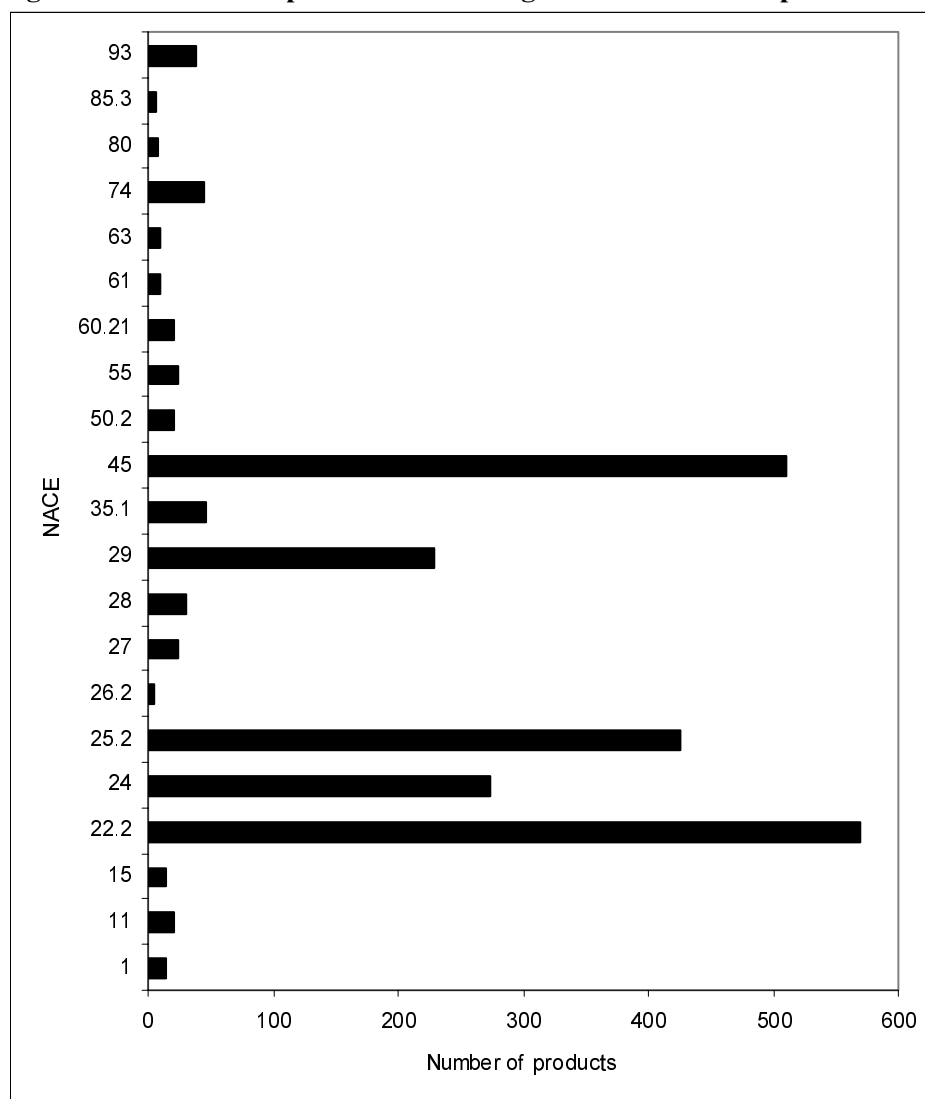


¹ Use of diethylhexylphthalate (3265 tonnes) in NACE 24 and 25.2 are not included, as it will dominate the picture.

Source: The Norwegian Product Register

Figure 5.2 shows the number of products per branch. It seems like branch 22.2 'Printing and service activities related to printing' and 45 'Construction' has the highest number of products containing OSPAR chemicals.

Figure 5.2. Number of products containing OSPAR chemicals per NACE.



Source: The Norwegian Product Register

The quantities of the chemical used are not given on a detailed level of NACE. Data for chemicals per detailed level of NACE is limited in the Product Register, as many of the manufacturers report NACE on a two or three digit level. In most of the cases where there exists a four or five-digit NACE, the data will not be available due to confidentiality reasons i.e. the number of products used in the branch is too low. Most data will be available at a higher level of NACE. This conclusion is based on the search of the OSPAR chemicals it may be otherwise for other chemicals.

More data may however be available at an aggregated level, e.g. like PAH. As mentioned above, quantities of the different chemicals included in PAH have been added so more data could be used. If aggregated data is to be used, the toxicity/hazardous level of the different chemicals could be considered. Warning labels for each chemical is to be reported to the Product Register. The warning label also covers carcinogenic, sensitising or mutagenic properties and toxicity for reproduction.

In Sweden, the Statistics Sweden (SCB) and the Swedish National Chemicals Inspectorate (KemI) are co-operating in making statistics for hazardous chemicals. Such collaboration does not exist in Norway. The Norwegian Pollution Control Authority (SFT) is, however, publishing reports yearly, which include the flow of some selected hazardous compounds (SFT 1998). Data from both Statistics Norway and the Norwegian Product Register have been used in their work. In the Swedish work the chemicals are distributed per branch and product type (SCB/KemI 1998). In the report from the SFT (1998), the consumption of chemicals is given per product type only.

5.2. Chemicals per product type

As mentioned above chemicals per product type are at the time being only available at paper copies, and it was a time demanding task to use the data. Table 5.2 shows OSPAR chemicals per product type available from the Product Register. As seen for the distribution per branch in table 5.1, the product type cannot be given for several of the chemicals due to confidentiality rules. In some cases also some important product types cannot be given. This is very visible for lead where total amount is 6972 tonnes, but only 0.05 tonnes are specified used in product type 'M0500 Paint'.

Table 5.2. OSPAR chemicals per product type. Tonnes

Cas no.	Name	Product type code	Product type name	Tonnes
	PAHs¹			1088
50328	Benzo(a)pyrene			5.1
91203	Naphthalene			1067
192972	Benzo(e)pyrene	M0500	Paint (varnish)	5.1
				0.06
205992	Benzo(b)fluoranthene	M0500	Paint (varnish)	8.4
				0.07
	Short chained chlorinated paraffins (SCCP)			
85535848	Chlorinated paraffins, short chained			15.9
	Mercury and organic mercury compounds			
7439976	Mercury			0.4
7440439	Cadmium			1.7
	Lead and organic lead compounds			
7439921	Lead ²	M0500	Paint (varnish)	6972
				0.05
	Organic tin compounds			
2155706	Tributyltinmetacrylate			31.1
26354187	Tributyltinmetacrylate-methylmetacrylate			28.1
85409172	Tributylstannane, mono(naphtenoyloxi)deriv.	I0500	Impregnating agents	6.9
		M0500	Paint (varnish)	5.6
				0.4

Cas no.	Name	Product type code	Product type name	Tonnes
9016459	<i>Nonylphenol/etoxyates (NP/NPEs) and related substances</i> Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy-			136
		B2010	Binders for paint, glue etc.	0.3
		F5000	Chemical precipitants (flocculating agents)	0.4
		K3000	Preservatives (additives)	0.3
		M0500	Paint (varnish)	0.06
		M0550	Floor paints	0.08
		M0599	Other paints and varnishes	24.4
		M1540	Rust removers	0.2
		M1500	Metal surface treatment preparations (not paints/primers)	0.02
		O2500	Surface active agents (surfactants, detergents)	26.8
		P1010	Car polish (wax)	14.4
		R1000	Cleaning products	28.0
		R1010	Degreasing agents	6.5
		R1015	Ordinary cleaning products	4.5
		R1018	Disinfectants	0.8
		R1000	Cleaning products	0.2
		R1099	Other cleaning products	5.0
		S4000	Releasing agents	0.4
		S8000	Raw materials for synthesis	1.9
		T1590	Other printing inks	0.02
		X6608	House paints (exterior)	0.6
		X6609	Interior paints	3.3
25154523	Nonylphenol			26.0
		B2010	Binders for paint, glue etc.	6.1
		G3000	Floor covering (jointless floors)	0.7
		H1500	Hardeners	0.8
		M0550	Floor paints	2.7
		M0560	Primers	0.2
		M0570	Furniture varnish	2.2
		M0599	Other paints and varnishes	0.9
26027383	Poly(oxy-1,2-ethanediyl), a-(4-nonylphenyl)-w-hydroxy-			1.0
		M0500	Paint (Varnish)	0.2
37205871	Poly(oxy-1,2-ethanediyl), a-(isononylphenyl)-w-hydroxy-			7.9
		O2500	Surface active agents (surfactants, detergents)	2.2
		R1000	Cleaning products	1.7
51811791	Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy, phosphate			0.1

Cas no.	Name	Product type code	Product type name	Tonnes
68412544	Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy-, ramified			298
		B2010	Binders for paint, glue etc.	0.7
		L1000	Adhesives	1.3
		M0500	Paint (varnish)	20.8
		O2500	Surface active agents (surfactants, detergents)	97.6
		P1010	Car polish (wax)	3.5
		R1000	Cleaning products	61.8
		R1010	Degreasing agents	15.8
		R1015	Ordinary cleaning products	2.9
		R1018	Disinfectants	1.4
		R1000	Cleaning products	1.2
		R1099	Other cleaning products	44.2
109909399	Poly(oxy-1,2-ethanediyl), a-sulpho-w(2,4,6-tris(1-methylpropyl)phenoxy)-			0.4
		M0500	Paint (varnish)	0.3
	Nonylphenoletoxilate with EO < 9 Nonylphenoletoxilate with EO = 9-19			4.4
				2.4
		R1000	Cleaning products	2.3
81152	<i>Musk xylene</i>			0.04
		R1000	Cleaning products	0.01
84742	<i>Certain phthalates - dibutylphthalate and diethylhexylphthalate</i> Dibutylphthalate			176
		H1500	Hardeners	5.3
		L1040	Resins for 1- and 2-component glues	7.1
		M0500	Paint (varnish)	5.1
		M0560	Primers	0.04
		M0570	Anti-corrosion paint	2.5
		M0599	Other paints and varnishes	40.6
		T1500	Printing inks	1.5
		U0500	Filling agents	73.4
117817	Diethylhexylphthalate			3348
		B3500	Plasticizers (plastic, rubber, paint, glue)	3148
		F0520	Other dyes	1.5
		M0500	Paint (varnish)	4.0
		M0560	Primers	1.5
		M0599	Other paints and varnishes	8.5
		T1500	Printing inks	8.1

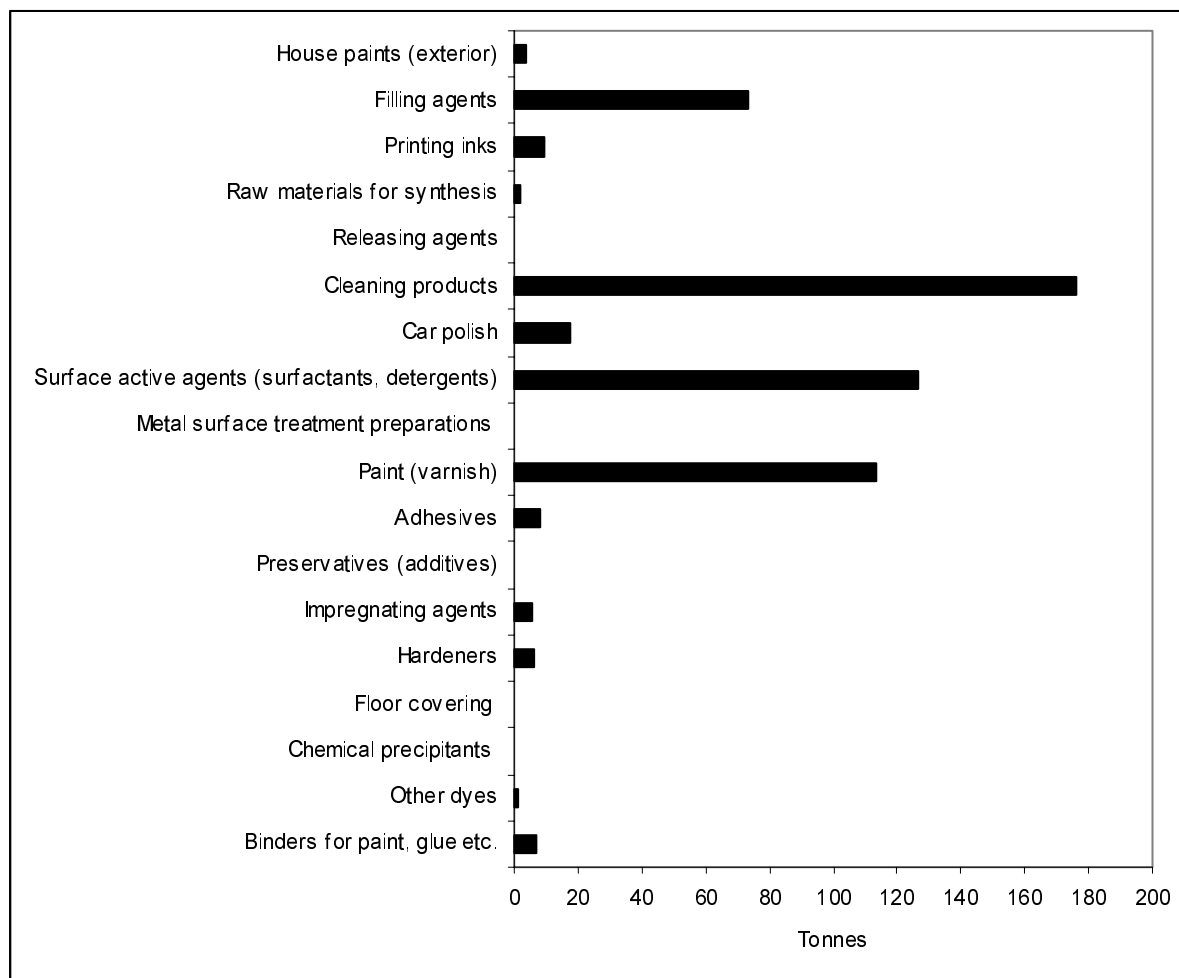
¹ PAH include: antracen, benzo(a)pyrene, naphtalene, phenantrene, benzo(e)pyrene, benzo(b)fluoranthene and benzo(k)fluoranthene.

² Almost the whole amount belong to a product which not can be given in the list.

Source: The Norwegian Product Register

Figure 5.3 shows the OSPAR chemicals per product type. It seems like cleaning products, surface active agents and paint have the highest content of these chemicals.

Figure 5.3. OSPAR chemicals per product type¹. Tonnes



¹ Product type B3500 'Plasticizers (plastic, rubber, paint, glue)' is not included in the figure, as it will dominate the picture. 3148 tonnes diethylhexylphthalate is registered as this product type.

Source: The Norwegian Product Register

A few more chemicals can be given when per product type than per branch, but the total amount is higher per branch.

6. Discussion

6.1 General

The OSPAR chemicals that were found in the Product Register given per NACE and per product type are only available on paper copies. Using data in this form will be a very time-consuming job. Ideally all the information should be available in files in common software and the data should be on an easy useable form. As the situation is today, a lot of useful data exists but it is complicated and time demanding to make use of it.

Another limitation of the use of data from the Product Register is the confidentiality rules. The number of products, which contain a specific chemical, used in each branch is given. Only if four or more products are used in a branch the data can be used. A limitation will also be the number of

manufacturers reporting the product, only if more than three companies' report a product the data can be used. More data may however be available if the information is known from other sources. This is however a time demanding task. The confidentiality rules may be easier to overcome in larger countries with more plants and products.

As seen in table 5.1, most of the chemicals per branch are given at a two-level NACE. In some branches this may however be useful, but generally this is less detailed than needed in EPIS. The data per product types can be used, but a relation to branch has to be given. To establish such a connection between the branch and product type for each chemical in the Product Register will be time consuming as it has to be done manually at the time being and not on the computer. The Product Register is planning to work on their data systems in the near future to make it more usable.

In the solvent balance for Norway (Rypdal 1995), the emissions from the different types of solvents are distributed by branch by using different source e.g. the National Account, specific knowledge. A possibility is to use the same method to distribute product types per branch.

The Product Register have, first of all, to make their data system easier to use before it can be a suitable data source for the Norwegian EPIS work.

6.2 Classification systems

A comparison of the data from the Norwegian Product register with PRODCOM (PRODUCTION COMMunautaire) could be useful. PRODCOM is used in the production statistics (Industry Statistics), and it is closely related to the classification used in the statistics on use of raw materials. It would be an advantage if the product types in the Product Register could harmonise with the classification used in Statistics Norway.

There is made a 'cross table' as an attempt to compare the two classifications used in the Product register and Statistics Norway respectively (table 6.1) for some selected product types. It seems like PRODCOM and the product types used in the Product Register do not correspond very well. For the products in the product type L1000 'Adhesives' the correspondence to PRODCOM seems not to be good. Some product types may however be more comparative to PRODCOM at an aggregated level. More detailed knowledge about the different products is needed to make a comparison.

PRODCOM is related to NACE, but several PRODCOM codes can correspond to one NACE and vice versa. So using PRODCOM will be a complicated way to find product type per branch.

As mentioned earlier, the declaration requirements in the Swedish Product Register are based on the customs tariff codes so that as a general rule, they apply to all chemical products (substance and preparations). The Swedish register therefore contains more products than those classified as dangerous according to EU legislation. It would be an advantage if the Norwegian Product Register also could use the custom tariff codes. The import and export statistics are based on customs tariff, so a link could be made. There is also possible to make a linkage between the custom tariff codes and PRODCOM. In that way a combination of the import and export statistics and production statistics can be made.

Table 6.1 Product type from the Product Register and PRODCOM

Product type		PRODCOM	
I0500	Impregnation agents		
I0510	Leather impregnating agents		
I0520	Paper impregnating agents		
I0530	Textile impregnating agents		
I0540	Wood impregnating agents	20109000	Treatment; impregnation and preservation of wood (incl. seasoning and drying)
I0550	Other impregnating agents		
L1000	Adhesives	24621013	Casein glues
L1010	Hot-melt glue	24621015	Caseinates and other casein derivatives (excl. casein glues)
L1020	Dispersion glue	24621050	Bone glues; other glues of animal origin (excl. casein glues)
L1030	Solvent-based glues	24621060	Glues based on starches; dextrans or other modified starches
L1040	Resins for 1- and 2-component glues	24621070	Products as glues or adhesives p.r.s., <= 1 kg
L1050	Other glues	24621080	Adhesives based on rubber or plastic (incl. artificial resins) (excl. p.r.s. in packages weighing <= 1 kg)
		24621090	Prepared glues and other prepared adhesives, n.e.c.
M1500	Metal surface treatment preparation (not paints/primers)		
M1510	Pickling agents for metals	28512230	Wet painting and varnishing of metals
M1520	Non-galvanic metal coating (for chromating, etc.)	28511150	Metallic coating by thermal spraying
		28511170	Metallic coating in zinc by electrolysis
		28511190	Metallic coating by electrolysis or chemical treatments of metals other than zinc (incl. nickel, copper, chromium, precious metals, etc.)
M1530	Hardeners for metal		
M1540	Rust removers		
M1550	Other metal surface treatment preparations	28511130	Metallic coating by immersion in molten metals (zinc galvanizing or tin dipping)
		28511230	Plastic coating of metals (incl. powder coating)
		28511250	Other coatings (phosphating etc.)
		28512100	Heat treatment of metals (excl. metallic coating, plastic coating)
		28512250	Anodizing of metals
		28512270	Vapour deposition of metals
		28512290	Other metallic surface treatments

7. Conclusions

The Product Register has a lot of useful information about chemicals. In this work the OSPAR chemicals were chosen as an example. Quantities of the different chemicals given per NACE and per product type are available from the Product Register, but at the present the data are only available on paper copies. It will be a very time-consuming job to use it. Due to confidentiality rules, the data availability for most of the chemicals is low, but on an aggregated level more data can be used. If aggregated data is to be used the toxicity/hazard level of the different chemicals could be considered.

Data for chemicals per detailed level of NACE are limited in the Product Register, as many of the manufacturers report NACE on a two or three digit level. In most of the cases where there exists a four or five-digit NACE, the data will not be available due to confidentiality reasons i.e. the number of products used in the branch is too low. Data at a more detailed level than two-level NACE are preferred in EPIS, but in some branches where this may not be that important, the current data per branch from the Product Register can be used directly.

The data per product types can be used, but a relation to branch has to be given. It is possible to make a connection between the branch and product type for each chemical in the Product Register, but it will be time consuming as it has to be done manually at the time being and not on the computer.

As the situation is today, a lot of useful data for EPIS exists but it is complicated, time demanding and a certain uncertainty connected to make use of them. Also the confidentiality rules are an obstacle. Ideally all the information should be available on files in common software and the data should be on an easy usable form. The Product Register is planning to make their system more usable in the near future. There is planned to set down a working group to look at the possibility to have a common Nordic database. With such a database, more data will be available, as the confidentiality obstacle may be less. It would also be advantageous if the classification system used in the Product Register and Statistics Norway harmonise.

Further proposed work in the field of EPIS is to set up EPIS for the household sector and to extend the work on chemicals in EPIS. How data can be aggregated to indicators will be an issue included in the later work. Another future proposal for work is to test the relevance of EPIS developed in other pilot countries to some sectors in Norway.

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Terms and definitions

CAS number - Chemical Abstracts Service Registry number. Each chemical in the Norwegian Product Register has such an identity number.

Chemical Labelling Regulations - the term used for the Regulations relating to classification, labelling, etc. of dangerous chemicals and all the supplementary regulations.

Declaration - the declaration form includes information about company responsible for the declaration, list of customers/Norwegian distributors, manufacturer, company responsible for labelling, and information about the products, see section 3.1.

EPIS - Environmental Pressure Information System

Labelling - in the Norwegian Product Register danger symbols and R-phrases are registered.

OSPAR - Convention for the protection of the marine environment of the North-East Atlantic.

PRODCOM - PRODUCTION COMMUNAUTAIRE - classification used in the production statistics (Industry Statistics).

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